INTELLIGENT TELEPHONE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to the field of telephone line communication devices.

2. Prior Art

Communication devices for data communication over telephone lines are well known in the prior art. Typically such devices utilize some form of modem to modulate serial digital data into the frequency pass band of telephone systems for transmission, and to demodulate a corresponding received signal for recovery of the digital data at the receiving end. Such communication capability may be in a single direction at any one time (half duplex) or may include simultaneous bidirectional capabilities (full duplex). Using such communication techniques, various devices have been coupled to telephone lines for various purposes. By way of example, modems have been used to couple personal computers through telephone lines, generally for the purpose of data communication with other similar computers. In general such devices have not included a handset for voice communication and also such systems are relatively bulky, and accordingly they are generally limited to use for point-to-point data communications. In other instances, modems have been used for data communications over telephone lines between a central computer and one or more remote terminals specially configured for such use. While such terminals may include a full keyboard for data entry purposes, and a display for displaying entered and transmitted information, such terminals are generally limited in function and purpose to data entry and communication tasks and do not themselves provide any substantial form of self control or ability to control other devices.

One form of general purpose electronic telephone station is shown in U.S. Pat. No. 4,291,198. That device or system is microprocessor based and includes a handset, a video output display screen and a full alphanumeric key set, the keys being arranged generally as a normal "qwerty" organization but in an orthogonal array rather than in a conventional typewriter keyboard layout. The microprocessor based system allows various forms of control of the station set, though as with other prior art telephone line communication devices, it too is dedicated in purpose to communication, having the added feature of voice communication capabilities. Also the system of that patent utilizes a conventional telephone handset and a cathode ray tube display, having a substantially square display area. Accordingly the system is relatively large and not suitable for use as a portable device.

BRIEF SUMMARY OF THE INVENTION

A microprocessor based telephone like device includes all of the functions of any ordinary telephone, the functions of a data terminal and many additional functions to provide a highly useful voice and data communications and control device for both professional and personal use. The system generally includes a provision for direct connection and acoustic coupling to a phone line for ordinary voice communications or for data communications through a modem. A full alphanumeric keyboard coupled with a significant buffer memory and a one line display in the terminal provide for buffering of incoming and outgoing data as well as the display thereof. Inasmuch as the microprocessor based system is a bus oriented system, a great variety of controllers and communications devices and interfaces may be coupled thereto to provide a large array of data and voice communications and control capabilities.

Since the data storage in the device is in ASCII code form, the provision of an RS-232 controller on the system bus allows communication with and/or control of any of the large variety of ASCII RS-232 devices currently available, such as printers, terminals and personal computers, either directly from the telephone like device or from a remote location through the telephone line connected to the telephone like device. Other capabilities include the direct control of printer interfaces, voice synthesis systems, tape controllers, code readers and appliance controllers. Also if desired a composite video signal may be generated to expand the display capabilities from the single line display of the telephone like device to display on a video monitor or readily available standard television receiver to conveniently provide a multiline display in a very readily portable device.

DESCRIPTION OF THE FIGURES

FIG. **1** is a perspective view of the preferred embodiment of the present invention.

FIG. **2** is a block diagram of the system of FIG. **1**.

FIG. **3** is a circuit diagram of the random access memory subsystem.

FIG. **4** illustrates the interconnection of the central processing unit with the read only memory for program storage and the decoders for generation of chip select signals.

FIG. **5** is a schematic of the modem control and communications interface.

FIG. **6** is a schematic of the interconnections of the speech synthesizer.

FIG. **7** shows the power supply and liquid crystal display subsystems.

FIG. **8** shows the circuitry driving the speaker to provide audio output.

FIGS. **9** through **12** form a composite illustration of the overall electrical interconnection of the various subsystems of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows the keyboard terminal **10** of the present invention. A keyboard terminal **10** includes a hand set phone unit **12** which is coupled to the keyboard terminal **10** by a flexible cord **14**. The hand set phone unit **12** permits use of the keyboard terminal **10** in what may be referred to as the typical "Ma-Bell" telephone operating mode. The keyboard terminal **10** has a case **16** molded as shown at **17** to accept and secure thereto the hand set phone unit **12**. The keyboard **18** has a plurality of keys **20** including some specialized keys particularly suited to the application modes to be discussed below. These special keys include a control key **22**, a shift key **24**, a return key **26** and a rub out key **28** as well as status keys **30**. While keyboard **18** has the usual numbers 0–9 located in the position as on most typewriters, a given user may prefer to have a separate set of number keys organized in the "adding machine" layout. By appropriate activation of preselected keys, "FUNC", "CNTL", and "N", a "numeric pad" **31** is formed. The numbers 7, 8 and 9 then replace the letters T, Y and U. Th letters G,